REMARKS

This is in full and timely response to the above-identified Office Action. Reexamination and reconsideration in light of the proposed amendments and the following remarks are respectfully requested.

Claim Amendments

In this response, claim 2 has been cancelled and its subject matter introduced into claim 1. However, the recitation of "Pb $(Zr_xTi_{1-x})O_3$ $(0 \leq x \leq 1)$ with and without excess lead", has been omitted. Claims 9, 10 and 11 have been amended to clarify the scope of the claimed subject matter thus rendering it necessary for the scope to limited by the respective preambles.

Claim Rejections

1) The rejection of claims 1 and 3-6 under 35 USC § 102(a) as being anticipated by Perino et al. is respectfully traversed.

In this response, the subject matter of claim 2 is incorporated into claim 1. However, as noted above, the recitation of "Pb $(Zr_xTi_{1-x})O_3$ $(0 \leq x \leq 1)$ with and without excess lead", has been omitted. This omission overcomes the anticipation of claims 1, and 3-6 in that the removal of the recitation of lead zirconate titanite from the subject matter of claim 2, renders the remaining materials which are listed, both novel and non-obvious.

2) The rejection of claims 1, 3 and 5-12 under 35 USC § 103(a) as being unpatentable over Malone et al. (Malone) in view of Perino et al. (Perino) is respectfully traversed.

The foundation of this rejection is that Malone teaches the claimed structure with the acknowledged difference that there is no disclosure of the thickness of the at least one dielectric layer being in the range of 0.25-0.75 μm; and that the teachings of Perino

disclose a ferroelectric type dielectric film having a thickness of 0.3 μm. Motivation is advanced as being that one of ordinary skill would be motivated to transferr teachings from Perino to Malone in order to minimize a capacitor arrangement found in Malone.

In traverse, it is submitted that, as will become clear hereinbelow, the multi-layer structure of Malone would not be "modified" in the manner purported in this rejection and that a *prima facie* case of obviousness is not established.

The structure in Malone is such that an air gap is provided between two plates 130 and 122 to form a capacitor. The stacked structure 150 which supports plate 122, can be activated by the application of a voltage whereby the lower plate 122 is physically driven toward/away the upper plate 130 to vary the capacitance developed between plates 122 and 130.

In other words, the structures 150 which is alleged in this rejection to be passive ceramic component is quite the reverse and is not a capacitor but is actually an active voltage controlled displacement device. That is to say, the arrangement disclosed in Malone is a multi-layer linear acting motor which is used to drive one plate toward/away from another.

More specifically, Malone discloses (see the abstract for example) that an array 100 of voltage variable capacitors 110 is provided with piezoelectric displacement devices 150. The voltage variable capacitors 110 have first and second plates 120, 130. The second plates 120 (which comprise metallic layers 122 and separation layers 24) are coupled to the displacement devices 150. The displacement devices 150 include a stack of metallic layers 154, voltage variable material blocks 152, and voltage supply terminals 170 and 180. Malone further discloses that voltage differences are established across voltage variable material blocks 152 using voltage supply terminals 170 and 180 and that this causes the voltage variable material layers to change thickness. This change in thickness results in the first plate 120 being moved relative to second plate 130.

It is submitted at this point that the air gap between the juxtaposed plates 130 and 122 is necessary to permit relative displacement between the two plates which actually comprise the capacitor. To interpose a solid layer between these two plates (in the manner disclosed in Perino) would render the disclosed arrangement inoperative for its intended purpose because it would prevent the relative movement which is produced by the displacement device 150.

It is further submitted that, to reduce the thickness of the layers of PZT material between the horizontally extending metallic layers 154 to 0.3μm, in the manner purported in this rejection, is not at all suggested by either reference, and if implemented would not only invite a large decrease in displacement capacity but also risk rendering each of the active displacement devices 150 inoperative for their intended function. That is to say, the change in thickness of each layer of PZT material must, when combined, produce a required amount of displacement of the plate 122 toward/away from plate 130. There is nothing in either reference to suggest that the voltage induced distortion of very thin PZT layers (i.e. layers having a thickness of 0.3μm) would generate the intended amount of displacement and nothing to induce the hypothetical person of ordinary skill to consider such a thickness in the Fig. 1 arrangement of Malone which focused on in this rejection.

In fact, there is nothing in either reference which might induce the hypothetical person of ordinary skill to consider miniaturizing any of the arrangements disclosed in Malone. The use of the PZT actuators/displacement device would, absent some clear directives, not be considered for manufacture on a semiconductor scale such as found in Perino. To further complicate matters, the PZT layer 39 in Perino is <u>not</u> intended to distort in response to an applied voltage inasmuch as a dynamic change in configuration/thickness, would invite permanent damage to the ferroelectric layer 39 and the electrodes 37, 39 which are disposed on either side thereof. The introduction of layers which do not change shape/thickness into the Malone arrangement in the manner advanced in this rejection would, of course, render the displacement devices of Malone completely inoperative.

> "If the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious. *In re Ratti*, 270 F.2d 810, 123 USPQ 349 (CCPA 1959)." M.P.E.P. § 2143.02.

A further shortcoming that would be encountered in that, if the proposed combination of art were to be contemplated, in order to achieve an accurate transfer from Perino to Malone, then there would be the need to consider forming the electrodes and dielectric film arrangement of Perino on a silicon substrate as different from using the dielectric material as the base as is the case in the displacement devices disclosed in Malone.

Further consideration would have been given by the hypothetical person of ordinary skill to the disclosure that Malone is directed to a capacitor array for use in microwave components (column 1, lines 35-42) while the structure in Perino is directed to IC memory arrangements (column 1, lines 29-44). It would be immediately apparent to the hypothetical person of ordinary skill that the level of capacitance and applied electrical power is quite different in each of these applications. Therefore, it is submitted that when starting out from Malone, the hypothetical person of ordinary skill would not be inclined to consider the teachings of Perino in connection with a possible modification of the basic Malone arrangement and that this hesitancy would not be negated unless some very clear and explicit teachings were to be made available.

As noted above, such teachings/directives are not to found in the art which is applied. Therefore, for at least this reason, the hypothetical person of ordinary skill would not be inclined to consider a transfer of teachings between Perino and Malone and therefore a *prima facie* case of obviousness is not established.

Conclusion

Applicant submits that the present application is now in condition for allowance. Favorable reconsideration of the application as amended is respectfully requested. The Examiner is invited to contact the undersigned by telephone if it is felt that this would expedite the resolution of any remaining issues and advance the prosecution of the present application.

Respectfully submitted,

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